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Disk cartridge carrying device

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Specification

1.. [Title of the invention]

Disk cartridge carrying device

2. [Scope of the patent claims]

(1). The disk cartridge carrying device is equipped with the holder part having the holder that holds the disk cartridge to be carried, free to put in and take out, and the feeding mechanism for putting in and taking out the disk cartridge against said holder,
The holder part carrying means that moves aforementioned holder part in order to carry the aforementioned cartridge held in aforementioned holder to a desired location,
The feeding operation drive source set up separated from aforementioned holder part, in order to be independent from the carrying operation by aforementioned holder part carrying means,
And the transmission means wherein one side is joined to the aforementioned feeding operation drive source, and the other side is joined to the aforementioned feeding mechanism by a spline, thereby, driving fore by said feeding operation drive source is transmitted to the aforementioned feeding mechanism independently from the carrying operation by aforementioned holder part carrying means.

(2). The disk cartridge carrying device described in the claim item 1 wherein aforementioned feeding mechanism includes the

feeding roller mechanism that puts in and takes out the said cartridge by pressure welding to the cartridge to be put in and taken out and rotating it, the support mechanism wherein said feeding roller mechanism is supported enabled to fluctuate, and when aforementioned said cartridge is ready to be put in and taken out, said feeding roller mechanism is moved in the direction of being pressured welded to said cartridge,

Aforementioned feeding operation drive source includes the rotation drive source for rotating aforementioned feeding roller mechanism and the fluctuation drive source for fluctuating aforementioned support means,

Aforementioned transmission means includes the rotation transmission means wherein one side is joined to the aforementioned feeding operation drive source, and the other side is joined to the aforementioned feeding mechanism by a spline and the drive force by said rotation drive source is transmitted to said feeding roller mechanism, and the fluctuation transmission means wherein one side is joined to the aforementioned feeding operation drive source, and the other side is joined to the aforementioned support mechanism by a spline and the drive force by said fluctuation transmission means is transmitted to said support means. /2

3. [Detailed explanation of the invention]

[Utilized field in industry]

The present invention relates to the disk cartridge carrying device

in the optical disk library devices and the like, and particularly, to the one that simplifies the structure of the holder part that carries, and reduces the weight thereof.

[Prior arts]

regarding optical disk library device which stores and drives optical disk cartridges (hereafter called cartridge), as one example is shown in figure 6, it is equipped with a storage rack 2 that stores multiple cartridges 1, a drive 3 that drives cartridge 1, and disk cartridge carrying device 4 that carries cartridges 1 between a storage rack 2 and a drive 3. Regarding this optical disk library device, on one side of aforementioned carrying device 4 (one side) is positioned a storage rack 2 and a drive 3. and said carrying device 4 is equipped with a holder 6 that moves up and down between a storage rack 2 and a drive 3 while holding a cartridge 1, the holder mechanism HB constituted by various members that that feed out cartridge 1 from the holder 6 that takes in cartridge 1 into said holder 6.

That is, this holder mechanism HB is designed such that aforementioned holder 6, as shown in figure 7, puts in the cartridge 1 to be carried from the end part opening 6a formed at one end that faces a storage rack 2 and a drive 3, and feeds out the cartridge 1 carried. And this holder 6 is supported by the base frame 5 positioned in its surrounding, and when base frame 5 moves up and down along transporting guide G by ascending and descending

drive means M constituted by a motor (figure 6) and no edge belt (not shown in figures) and the like, it moves up and down integrally with said base frame 5, thus cartridge is carried. Furthermore, a holder 6, in order for the back and front of the recording surface of cartridge 1 accessed by the head of a drive 3 to be reversed, it is rotateble by 180 deg against base frame 5 by rotation shaft 15 driven by a suitable means.

This holder mechanism HB, in order to put in and take out the cartridge between aforementioned holder 6 and a storage rack 2 or a drive 3 (feed out and take in), as shown in figure 8, is equipped with a pair of outer direction feeding rollers 7, 7 positioned outer direction side than the aforementioned end part opening 6a of the holder 6, and a pair of center feeding roller 10, 10 positioned at the center part of both sides of the holder 6.

Outer direction feeding rollers 7, 7, at one end, are supported rotatebly by other end part of an upper direction fluctuating arms 8, 8 mounted on base frame 5 enabled to fluctuate via shaft 9, 9. Likewise, center feeding rollers 10, 10, at one end, are supported rotatebly by other end part of an upper direction fluctuating arms 8, 8 mounted on base frame 5 enabled to fluctuate via shafts 11, 11.

Each fluctuating arms 8, 13 are rotateble against each shaft 9, 11, and centered on said shafts 9, 11, fluctuate between the operation position where corresponding outer direction feeding

roller 7, 20 makes contact with cartridge 1 to be put in and taken out against a holder 6, and the waiting position so that outer direction feeding roller 7, 10 do not make contact with the cartridge 1. The fluctuation of such fluctuating arms 8, 13 are designed to be executed by fluctuating drive means DR1, DR2 that comprise solenoids and springs set up for each fluctuating arms 8, 13. Each outer direction feeding roller 7 rotates via no edge belt 18 driven by the rotation of toothed wheel 16 by driving toothed wheel 14; each center feeding roller 10 rotates via no edge belt 19 driven by the rotation of toothed wheel 17 by aforementioned driving toothed wheel 14. And each aforementioned driving toothed wheel 14 is rotated by rotation drive means DR3 constituted by a motor set up for each driving toothed wheel 14. and, aforementioned feeding rollers 7, 10, fluctuating arms 8, 13, driving toothed wheels 14, 16, 17, Fluctuating drive means DR1, Dr2 and Rotation drive means DR3 are supported over the base frame 5, and moves up and down along with base frame 5 by aforementioned ascending and descending drive means.

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Regarding this holder mechanism HB, for instance, when cartridge 1 is taken in from a drive 3 to a holder 6, first of all, as an upper direction fluctuating arms 8, 8 fluctuate from waiting position to the operation position by aforementioned drive means DR1, DR1, while the outer direction feeding rollers 7, 7 are

approaching each other, it sandwiches the front end part of cartridge 1 that protrudes from a drive 3. Next, outer direction feeding rollers 7, 7 feed said cartridge 1 by Rotation drive means DR3, DR3 until cartridge's front end part arrives at approximately center position inside the holder 6. Hence, as upper direction fluctuating arms 8, 8 fluctuate and are restored to the initial waiting position by aforementioned drive means DR1, DR1, while outer direction feeding rollers 7, 7 are mutually separating, withdraws from the cartridge 1. Simultaneously with this, as fluctuating arms 13, 13 fluctuate to the operation position from the waiting position by fluctuating drive means DR2, DR2, center feeding rollers 10, 10, while mutually approaching, through side part openings 6b, 6b formed on both side of the holder 6, thrust into the holder 6 and sandwiches the front end part of cartridge 1. Doing like this, center feeding rollers 10, 10, while being rotated by Rotation drive means DR3, DR3, as shown by two points chained line, takes in the aforementioned cartridge 1 to the specified position inside the holder 6. Thus, when cartridge 1 is taken into the holder 6, as fluctuating arms 13, 13 fluctuate and are restored to the initial waiting position , center feeding rollers 10, 10 mutually separate and withdraw from cartridge 1. Doing as above, when the cartridge 1 taken in and carried by a holder 6 is fed from the said holder 6 to, for instance, the storage rack 2, said cartridge 1, reversing the aforementioned sequence,

is fed, first, by center feeding rollers 10, 10 and next, by outer direction feeding rollers 7, 7.

And, regarding the holder that carries the cartridge 1 while holding it as described before, as shown in figure 9, there is double pocket type holder 52 wherein for instance, two holders 6 in figure 7 are set up in parallel in the long hand direction of the transporting guide G, thereby, upper direction and low direction holder pocket Pa, Pb are formed that can hold one cartridge 1 respectively. By the way, aforementioned holder 6 can be called one pocket type holder. Regarding the holder mechanism that uses this double pocket type holder 52, for instance, in case cartridge 1 driven by a drive 3 is exchanged, cartridge 1 already driven is taken into the empty upward holder pocket Pa from a drive 3, and doing same process (that is, without requiring that said cartridge 1 be returned to the storage rack 2, as is), said other cartridge 1 is made possible to be fed out from the downward holder pocket Pb that holds the other cartridge 1 against the drive 3, and compared with the holder mechanism HB that uses aforementioned one pocket type holder 6, the merit is that work efficiency is improved. /4

[Problems the present invention attempts to solve]

However, regarding the holder mechanism that uses double pocket type holder 52, in order to have the aforementioned performance, it is necessary that regarding each holder pocket Pa, Pb, cartridge

1 can be put in and taken out, and while one of both holder pockets Pa, Pb is suitably being selected, cartridge 1 can be put in and taken out. Hence, regarding, this holder mechanism, for each holder pockets Pa, Pb, as shown in figure 8, it is necessary to set up outer direction feeding rollers 7, 10, fluctuating arms 8, 13 and Fluctuating drive means DR1, DR2 and the like (however, Rotation drive means DR3 can use one that share regarding both holder pocket Pa, Pb). Because of this, when a cartridge 1 is carried, the holder 52 that moves up and down by aforementioned ascending and descending drive means M and other parts (hereafter called holder part), as a result, it is necessary that ascending and descending drive means M uses a large type with large power. And, as the weight of the holder part gets larger, the up and down speed of the holder part by ascending and descending drive means M, hence, the carrying speed of cartridge 1 decreases.

The present invention was done in view of the above described points, and the purpose is to provide the disk cartridge carrying device that can reduce the weight of holder part.

[Means to solve problems]

In order to attain the above described purpose, the characteristics of the disk cartridge carrying device of the present invention is that the disk cartridge carrying device is equipped with the holder part having the holder that holds the disk cartridge to be carried, free to put in and take out, and

the feeding mechanism for putting in and taking out the disk cartridge against said holder, the holder part carrying means that moves aforementioned holder part in order to carry the aforementioned cartridge held in aforementioned holder to a desired location, the feeding operation drive source set up separated from aforementioned holder part, in order to be independent from the carrying operation by aforementioned holder part carrying means, and the transmission means wherein one side is joined to the aforementioned feeding operation drive source, and the other side is joined to the aforementioned feeding mechanism by a spline, thereby, driving fore by said feeding operation drive source is transmitted to the aforementioned feeding mechanism independently from the carrying operation by aforementioned holder part carrying means. And aforementioned feeding operation drive source is separated from the aforementioned holder part, thus, the weight of said holder part that becomes the carrying target is reduced.

[Actions/operations]

Feeding operation drive source is set up separated from the aforementioned holder part, in order to be independent from eh carrying operation by holder part carrying means. The transmission means to transmit the drive force against the feeding mechanism of the holder part from this feeding operation drive source is structured such that one side is jointed to the feeding operation

drive source and other side is joined by a spline to the feeding mechanism, thereby, the drive force by said feeding operation drive source can be transmitted to the feeding mechanism independently from the carrying operation by holder part carrying means.

Since it is structured like this, it is not necessary that feeding operation drive source is carried with holder part by the holder part carrying means; thus, weight of holder part is decreased. Thus, the effect is that as the weight of holder part is decreased, the power of the holder part carrying means is made smaller. And it can prevent the carrying speed of cartridge from being reduced, and it is particularly effective in case it is executed for disk cartridge carrying device that uses double pocket type holder and the disk cartridge carrying device that handles large type disk cartridge.

Regarding one embodied example, feeding mechanism includes the roller mechanism that puts in and takes out the cartridge by rotating by pressure welding to the cartridge, and the support mechanism that supports the said roller mechanism slidably, and moves the said feeding roller mechanism in the direction to be pressure welded to said cartridge when aforementioned cartridge is due to be put in and taken out. In this case, aforementioned feeding operation drive source includes the rotation drive source to rotate aforementioned feeding roller mechanism and the fluctuation drive source to fluctuate aforementioned support

means. And, the aforementioned transmission means include the rotation transmission means wherein one side is joined to the aforementioned rotation drive source, and other side is joined by spline by aforementioned feeding roller mechanism, the drive force by said rotation drive source is transmitted to the said feeding roller mechanism, and the fluctuation transmission means wherein one side is joined to the aforementioned fluctuation drive source, and other side is joined by spline to aforementioned support means, and the drive force by said fluctuation drive source is transmitted to the said support means.

[Embodied examples]

The following will describe the present invention in details based on one embodied example shown in attached drawings.

Figure 3 is a flat surface drawing showing one example wherein the present invention is applied for disk cartridge carrying device 4 of the optical disk library device, and the constituent elements with the same symbols attached in figure 8 performs the same functions as ones in figure 8.

And, as shown in figure 2, in said optical disk library device, in order to expand the store amount, on one side of aforementioned carrying device 4, it is not only the first storage rack 2A and drive 3 are set up, but also, on the other side of said carrying device 4, second storage rack (expanded storage rack) 2B are set up facing the first storage rack 2A and a drive 3.

Regarding the holder mechanism HA, a holder 50 is double pocket type holder that comprises an upper holder pocket Pa and a lower holder pocket Pb as shown in figure 4, and as the holders move up and down along transporting guide G integrally with the base frame 5 by ascending and descending drive means M (figure 2),/4 thereby, the cartridge 1 held by either one or both of an upper or lower holder pocket Pa, Pb are carried between the first storage rack 2A or second storage rack 2b and a drive 3. Each holder pocket Pa, Pb, in order for the cartridge 1 to be put in and taken out between the first storage rack 2A, a drive 3 and second storage rack 2b, is equipped with end part openings 20a1, 20a2 for passing the cartridge at both end parts, and is shaped so that a cartridge 1 passes through these end part openings 20a1, 20a2, and can pass through in the direction (arrow A direction) that goes toward first storage rack 2A and a drive 3 (arrow A direction) and the direction that goes toward second storage rack 2B (arrow B direction). By shaping like this, for instance, after cartridge 1 of the second storage rack 2b is taken in from one side of end part opening 20a2 and carried, it can be sent out to the drive 3 from other side of end part opening 20a1. And, upper and lower holder pockets Pa, Pb, in order for the front and back of the recoding surface of cartridge 1 accessed by the head of the drive 3 to be reversed, by the rotation shaft 15 rotated by the suitable means not shown in figures, is rotated 180 deg against the base frame 5. At this

time, upper and lower holder pockets Pa, Pb can be rotated integrally.

Regarding this holder mechanism HA, the structure to put in and take out the cartridge 1 against the holder 50 is as shown in figure 1, for each holder pocket Pa, Pb, a pair of an outer direction feeding rollers 7a, 7a' 7b, 7b' and a pair of center sending rollers 10a, 10a', 10b, 10b' are set up. In the following, each outer direction feeding rollers 7a, 7a' and each center sending rollers 10a, 10a' that are set up for the upper holder pocket Pa are called upper pocket outer direction feeding rollers 7a, 7a', and upper pocket center feeding rollers 10a, 10a' respectively, and each outer direction feeding rollers 7b, 7b' and each center sending roller 10b, 10b' for the same will be called lower pocket outer direction feeding rollers 7b, 7b' and lower pocket center feeding rollers 10b, 10b' respectively. And, regarding this holder mechanism HA, the structure of both sides of holder 50 is about the same, hence, one side of the holder 50, that is, the structure on the nearer side in figure 1 will be explained.

That is, as clarified by figure 5, upper pocket outer direction feeding roller 7a is supported rotatebly via a shaft 22a, at the front end part of the upper direction fluctuating arms 8 that is made fluctuatable at the upper surface side of said base frame 5, centered on the shaft 9 that penetrated the base frame 5. Lower

pocket outer direction feeding roller 7b is supported rotatebly via a shaft 22b, at the front end part of a fluctuating arm 21 that is made enabled to fluctuate at the lower surface side of said base frame 5, centered on the shaft 9. At the upper edge part of aforementioned shaft 22a, a pulley 24a is fixed that is positioned on the opposite side of an upper pocket outer direction feeding roller 7a by intervening the upper direction fluctuating arms 8, and this pulley 24a is joined via the no edge belt 18a and a pulley 26a fixed to the upper end part of a shaft 9. And, at the lower edge part of a shaft 22b, a pulley 24b is fixed that is positioned on the opposite side of a lower pocket outer direction feeding roller 7b by intervening a lower direction fluctuating arms 21, and this pulley 24b is joined via no edge belt 18a to the pulley 26b fixed to the lower end part of a shaft 9. At the lower part than the upper direction fluctuating arms 8 at each shaft 9 is fixed a toothed wheel 16a, and said toothed wheel 16a engages with a drive toothed wheel 14a that rotates by rotating a spline shaft 30 that penetrates the base frame 5 and extends. Regarding the example shown in figures, the only spline shaft 30 on one side of a holder 50 is rotated by the motor RM as the rotation drive means, and the rotation motion of said spline /5 shaft 30 is transmitted to the spline shaft 30' on the other side via character 8 shaped no edge belt 29. Thus, the spline shaft 30' on the other side rotates in the opposite direction of a center

spline shaft 30 on the aforementioned other side. Furthermore, at each aforementioned shaft 9, a toothed wheel 16b is fixed to the upper part from a lower direction fluctuating arm 21, and said toothed wheel 16b engages with the drive toothed wheel 14b that rotates by the rotation of an aforementioned spline shaft 30. doing like this, each upper pocket outer direction feeding roller 7a, as the drive toothed wheel 14a rotates by a spline shaft 30, rotate via a toothed wheel 16a, a shaft 9, a pulley 26a, no edge belt 18a, a pulley 24a and a shaft 22a. And, each lower pocket outer direction feeding roller 7b, as the drive toothed wheel 14b rotates by a spline shaft 30, rotate via a drive toothed wheel 16b, a shaft 9, a pulley 26b, no edge belt 18b, a pulley 24b and a shaft 22b.

On the upper surface of an upper direction fluctuating arm 8 is set up a roller 8a, and a roller 8a is fixed by inserting through a spline shaft 40 that penetrates through the base frame and extends and can be engaged with an upper direction cam member 41 positioned outside of said arm 8. And on the lower surface of a lower direction fluctuating arm 21 is set up a roller 8b, and a roller 8b is fixed by inserting through aforementioned spline shaft 40 and can be engaged with a lower direction cam member 42 positioned outside of said fluctuating arm 21. An upper direction cam member 41 and a lower direction cam member 42 are fixed to a spline shaft 40 in an opposite direction so that it is centered on a spline shaft

40 and has about 180 deg angle in a horizontal direction. Furthermore, upper direction cam members 41, 41' that face each other on both sides of upper direction holder pocket Pa are fixed to the spline shaft 40, 40' respectively in an opposite direction so that they form about 180 deg angels in a horizontal direction. Likewise, lower direction cam members 42, 42' that face each other are fixed to the spline shafts 40, 40' respectively in an opposite direction so that they form about 180 deg angels in a horizontal direction. Each cam member 41, 41', 42, 42' are, as a spline shaft 40, 40' turn, pass between corresponding no edge belt 18a, 18a' and 18b, 18b', and fluctuating arms 8, 8' and 21, 21', can pressure weld the aforementioned rollers 8a, 8a', 8b, 8b'. And, the base frame 5, when it moves up and down by ascending and descending drive means M, slides against the transporting guide G and aforementioned spline shafts 30, 30', 40, 40'. And outside of each aforementioned fluctuating arms 8, 21 are attached a spring 44 whose one side is fixed to the base frame 5, and said spring 44

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always energizes the fluctuating arms 8, 21 into the waiting position. And in the example shown in figure, only the spline shaft 40 on one side of a holder 50 is joined to the upper rotary solenoid S1 and a lower rotary solenoid S2 as the fluctuation drive means of each fluctuating arms 8, 8', 21, 21' at its upper end and lower end. A upper direction rotary solenoid S1 turns the aforementioned

spline shaft 40 in the arrow H direction, and a lower direction rotary solenoid S2 turns the aforementioned spline shaft in the arrow I direction. When a spline shaft 40 turns in either direction by said solenoid S1 or S2, the turn motion of said spline shaft 40 is transmitted to the spline shaft 40' of the other side of holder 50 via a holder 50. Doing like this, a spline shaft 40' on aforementioned other side turns in the same direction as the spline shaft 40 of the aforementioned one side.

As described above, regarding this holder mechanism HA, Rotation drive means RM that turns each feeding roller 7a, 7a', 7b, 7b', 10a, 10a', 10b, 10b', and fluctuating drive means S1, S2 that fluctuate each fluctuating arm 8, 8', 21, 21' that supports the outer direction feeding rollers 7a, 7a'. 7b, 7b' are set up separated from the holder part, thereby, the weight of said holder part is reduced.

Regarding this Holder mechanism HA, in case a spline shaft 40 turns in the arrow H direction by a rotary solenoid S1, on one side of the holder 50, an upper direction cam member 41, while it turns in the arrow H direction, pressure welds the roller 8a, thereby, against the energizing force of the spring 44, an upper direction fluctuating arm 8 is fluctuated to the operation position. At this time, a lower direction cam member 42 fixed to the same spline shaft 40 as aforementioned upper direction cam member 41, while turning, withdraws from a roller 8b.

Hence, the lower direction fluctuating arm 21 is in a waiting position. And, at the same time, on the other side of the holder 50, a spline shaft 40' is turned in the arrow H direction via transmission shaft 46, and while the upper direction cam member 41' set up to have 180 deg angle against aforementioned upper direction cam member 41 is turning in the arrow H direction, it pressure welds a roller 8a', thereby, the upper direction fluctuating arm 8' is fluctuated to the moving position against the energizing force of the spring 44. At this time, lower direction cam member 42' that has the 180 deg angle against aforementioned lower direction cam member 42, while turning in the arrow H direction, withdraws from the roller 8b', hence, the lower direction fluctuating arms 21' stays in a waiting position. Doing like this, the upper direction fluctuating arms 8, 8' set up on the both sides of the holder 50 fluctuates to the operation position, thereby, upper pocket outer direction feeding rollers 7a, 7a' sandwich the cartridge 1 and is enabled to feed the cartridge 1. When aforementioned rotary solenoid S1 is turned off, each fluctuating arms 8, 8' fluctuate and is restored to the waiting position by the energizing force of the springs 44, 44. During this fluctuation restoration, spline shafts 40, 40' are turned to the initial position according to an upper direction cam member 41 by the roller 8a.

And in case of the example shown in figures, in case a spline shaft 40 is turned in the arrow I direction as the lower direction rotary solenoid S2 is turned on, lower direction cam member 42, 42', while turning in the arrow I direction, pressure weld the rollers 8b, 8b', thereby, fluctuating arms 21, 21' are fluctuated to the operation position against the energizing force of the spring 44. Thus, a lower pocket outer direction feeding roller 7b, 7b sandwich the cartridge 1 and can feed said cartridge 1. And at this time, upper direction fluctuating arms 8, 8' stay in a waiting position.

Each upper pocket center feeding roller 10a, centered on the shaft 11 that goes through base frame 5, is supported rotatebly via the shaft 37a on the front end part of fluctuating arm 13 that can be fluctuated on the upper surface side of said base frame 5. Each lower pocket center feeding roller 10b, centered on the aforementioned shaft 11, is supported rotatebly on the front end part of a fluctuating arm 23 that can be fluctuated on the lower surface side of said base frame 5 via the shaft 37b. an upper pocket center feeding roller 10a and a lower pocket center feeding roller 10b also rotate by the approximately similar structure as the aforementioned upper pocket outer direction feeding roller 7a and lower pocket outer direction feeding roller.
That is, an upper pocket center feeding roller 10a, while a drive toothed wheel 14a rotates by a spline shaft 30, rotates via a

toothed wheel 17a driven by said drive toothed wheel 14a, a shaft 11, a pulley 34a, no edge belt 19a, a pulley 36a and a shaft 37a. And, the lower pocket center feeding roller 10b, while a drive toothed wheel 14b rotates by a spline shaft 30, rotates via a toothed wheel 17 where aforementioned drive toothed wheel 14b rotates by a spline shaft 30, a shaft 11, a pulley 34b, no edge belt 19b, a pulley 36b and a shaft 37b. Furthermore, each aforementioned fluctuating arms 13, 23, when a solenoid S3 is turned on, fluctuate to the operation position, and when a solenoid s3 is turned on, fluctuate and is restored to the waiting position by the energizing force of the spring 38. doing as before, aforementioned fluctuating arms 13, 23 are fluctuated to the operation position, thereby, upper pocket center feeding roller 10a, and lower pocket center feeding roller 10b go through side part opening 20b, 20b formed on each holder pocket Pa, Pb and thrust into the corresponding holder pocket Pa, Pb, thus feeding the cartridge 1.

As shown in figure 3, on both sides of the second storage rack 2B positioned at other end part side of the holder 50, a pair of upper pocket outer direction feeding rollers, 48a, 48b and a pair/8 of lower pocket outer direction feeding rollers (in figure 3, only upper pocket outer direction feeding roller 48a, 48a' are shown) are set up that have the similar functions as aforementioned upper pocket outer direction feeding rollers 7a, 7a', and lower pocket

outer direction feeding rollers 7b, 7b'. Upper pocket outer direction feeding rollers 48a, 48a' and lower pocket outer direction feeding rollers (lower) operate by the similar structure as the one descried about aforementioned outer direction feeding roller 7a, 7a', 7b, 7b'. Doing like this, regarding aforementioned holder mechanism HA, not only putting in and taking out the cartridge 1 is going on between a drive 3 or the first storage rack 2A and each holder pocket Pa, Pb, but also putting in and taking out the cartridge 1 is going on between the second storage rack 2A and each holder pocket Pa, Pb.

The following will explain one example of the disk cartridge carrying device of the present invention while referring to figure 1.

First, for instance, in case cartridge 1 is taken into the upper holder pocket Pa from the first storage rack 2A, a spline shaft 40 on one side of the holder 50 is turned in the arrow H direction by a upper direction rotary solenoid S1, and simultaneously, the spline shaft 40' on the other side of the holder 50 turns in the arrow H direction, thereby, upper direction cam members 41, 41' fluctuate each fluctuating arms 8, 8' to the operation position. Because of this, upper pocket outer direction feeding rollers 7a, 7a sandwich the front end part both sides of the cartridge 1 that protrudes from the first storage racks 2A. And, at this time, lower direction fluctuating arms 23, 23' stay in a waiting position. Next, a spline

shaft 30 is rotated by the motor RM, simultaneously with this, a spline shaft 30' is rotated via no edge belt 29, then, drive toothed wheels 14a, 14a' start to rotate, aforementioned upper pocket outer direction feeding rollers 7a,7a' and upper pocket center feeding rollers 10a, 10' also start to rotate. Due to the rotation of upper pocket outer direction feeding rollers 7a, 7a' like this, aforementioned cartridge 1 is taken up to the approximately center position of an upper holder pocket Pa. doing like this, when cartridge 1 is taken up to the approximately center position of the upper holder pocket Pa, then, by turning off the aforementioned rotary solenoid S1, upper direction fluctuating arms 8a,8a' are fluctuated and restored to the waiting position by the energizing force of the springs 44, 44. Because of this, upper pocket outer direction feeding rollers 7a, 7a' withdraw from the aforementioned cartridge 1.

Next, a solenoid S3 is turned on, upper direction fluctuating arms 13, 13' fluctuate to the operation position. Thus, aforementioned cartridge 1 is sandwiched by upper pocket outer direction feeding roller 10, 10' that are rotating as described before, and is taken into the specified position inside an upper holder pocket Pa.

Cartridge 1 that was taken into the upper holder pocket Pa doing as before and held is carried to, for instance, a drive 3 as the holder 50 moves integrally with the base frame 5 moved by ascending and descending drive means M. Doing like this, in case it is carried to the drive 3, said cartridge 1 is sent out first by upper pocket

center sending roller 10a, 10a' and next by upper pocket outer direction feeding rollers 7a, 7a'. At this time, aforementioned feeding rollers 10a, 10a', 7a, 7a' is rotated in the reverse direction than when cartridge 1 was taken into the upper holder pocket Pa as described before.

And for instance, in case a cartridge 1 is taken in against lower holder pocket Pb from the first storage rack 2A, by turning on the lower direction rotary solenoid s2, spline shafts 40, 40' are turned in the arrow I direction, and along with this, lower direction cam members 42, 42' are turned in the arrow I direction. Doing like this, lower direction fluctuating arms 21, 21' are fluctuated to the operation position, and the cartridge 1 is taken into the approximately middle position of the lower holder pocket Pb by lower pocket outer direction feeding rollers 7b, 7b'. After that, said cartridge 1 is taken into the specified position inside the lower holder pocket Pb by lower pocket center feeding rollers 10b, 10b'.

And, regarding above described embodied example, upper and lower rotary solenoids S1, S2 and the motor RM both were separated from/9 the holder part, however, it is fine if either one of aforementioned solenoid S1, S2 and the motor RM can be designed to be separated from the holder part. And, the present invention is not limited to the above, but can be applied for the carrying device of the optical disk library device where a storage rack and the drive are provided on one side of the disk cartridge carrying device. And the present

invention can be applied for the disk cartridge carrying device of the optical disk library device but also for magneto optic disk cartridge and other information medium disk cartridge. Furthermore, the present invention can be applied not only for the double pocket type but also for one pocket type.

And, the carrying direction of the disk cartridge is not limited to the up and down direction as shown in the embodied example, but it can be a horizontal direction. In that case, as the holder part carrying means, replacing the ascending and descending drive means of the embodied example; suitable carrying device means is used.

[Effects of the invention]

As described above, according to the present invention, feeding operation drive source to put in and take out the cartridge from and into the holder was set up separately, hence, at the holder part carrying means, it is not necessary to carry the feeding operation drive source along with the holder part, thus the weight of the holder part was reduced, hence, the effect is that holder part carrying means is made smaller. And the cartridge carrying speed is prevented from being reduced, in case it is applied for the disk cartridge carrying device that uses a double pocket type holder or the disk cartridge carrying device that handles a large type disk cartridge, it is particularly useful.

4. [Simple explanation of the drawings]

Figure 1 is a three dimensional drawing showing the main part of

one embodied example of disk cartridge carrying device of the present invention, particularly, holder mechanism related part.

Figure 2 is a drawing explaining the entire optical disk library device using the same disk cartridge carrying device

Figure 3 is a flat surface drawing of the holder mechanism using the optical disk library device in figure 2

Figure 4 is a three dimensional drawing showing the holder of double pocket type in the aforementioned holder mechanism.

Figure 5 is a drawing explaining the structure on one side of the holder in aforementioned holder mechanism.

Figure 6 is a drawing explaining the entire traditional optical disk library device

Figure 7 is a three dimensional drawing explaining the holder of one pocket type

Figure 8 is a flat surface drawing explaining the traditional holder mechanism.

Figure 9 is a three dimensional drawing explaining the double pocket type holder

1..01

2A, 2B.. Storage rack

3... drive

4.. disk cartridge carrying device

7a, 7b... outer direction feeding roller

7a upper pocket outer direction feeding roller

7b lower pocket outer direction feeding roller

8, 21.. a fluctuating arm

30, 30'.. a spline shaft

40, 40'.. a spline shaft

41... upper direction cam member

42... lower direction cam member

50.. a holder

M... ascending and descending drives means

RM... Rotation drive means

S1, S2... A rotary solenoid

Figure 1

Figure 3

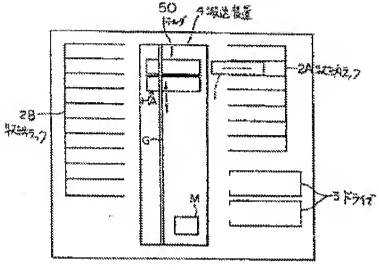
Left: disk cartridge

Rithtr: Pa upper holder pocket

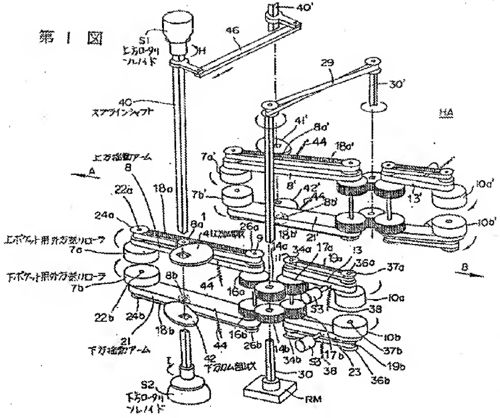
Figure 4

Pb: lower holder pocket

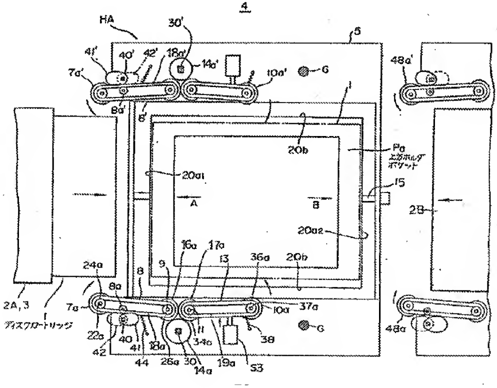
第 2 図



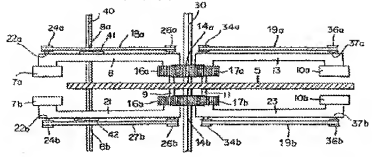
第 I 図


S1
上方ロータリソレノイド
H
46
40'
29
30'
40
スプラインシャフト
HA
41'
8a'
44
18a'
7a'
上方揺動アーム
A
8
22a
18a
7b'
8'
42'
8b'
10a'
13'
24a
8a
41 上方カム部材
26a
9
18b'
21'
10b'
上ポケット用外方案内ローラ
7a
14a
34a
17a
13
19a
36a
37a
B
下ポケット用外方案内ローラ
7b
8b
44
16a
S3
10a
38
22b
24b
18b
16b
26b
14b
10b
37b
21
下方揺動アーム
42
下方カム部材
34b
17b
19b
23
36b
30
RM
S2
下方ロータリソレノイド

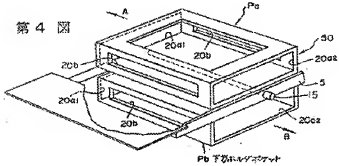
第 3 図

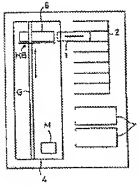

4
HA
30'
5
41'
40'
42'
18a'
14a'
7a'
10a'
6
48a'
8a'
8'
1
20b
Pa
上方ホルダポケット
20a1
15
A
B
2B
20a2
16a
17a
13
36a
20b
24a
8
9
8a
2A,3
7a
10a
37a
ディスクカートリッジ
22a
40
41
18a
11
34a
38
G
48a
42
44
26a
30
14a
19a
S3

第５図

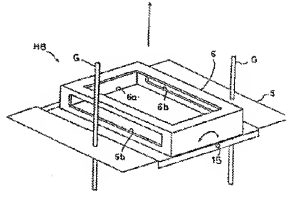


第４図

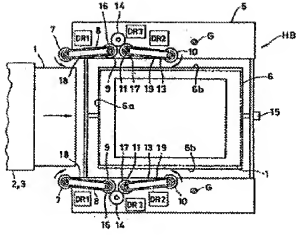




第６図

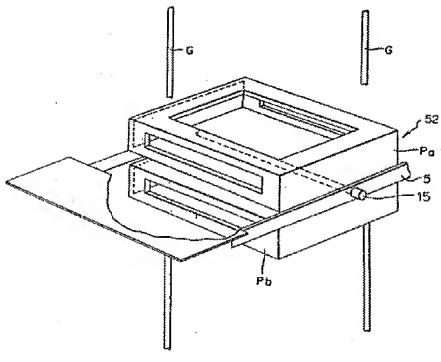


第７図


16 14
5
7
8
DR1
DR7
DR6
G
10
HB
1
18
9
11 17 13 19
6b
6
6a
15
2,3
DR1
8
DR3
DR2
16 14

第８図

第９図


G
G
52
Pa
5
15
Pb